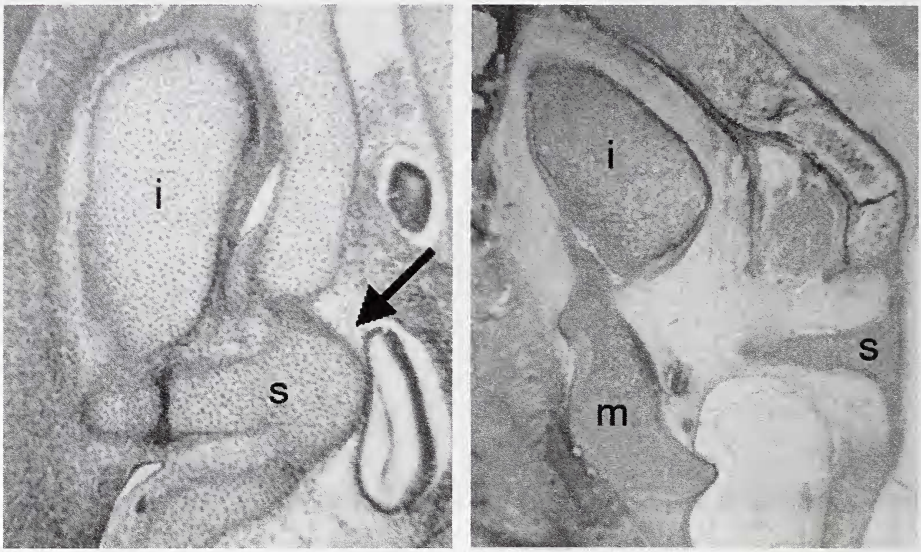

Fig. 2. Cross sections of a portion of the right middle ear of left) *Trichosurus vulpecula* (ZSH, HL = 7.5 mm) and right) *Perameles* sp. (ZSH, HL =17.5 mm). m = malleus, i = incus, s = stapes. The arrow indicates the bullate condition of the stapes. Not to scale.

and ecologically disparate) for which audiograms are available can be noticed. As pointed out by Aitkin (1995), *T. vulpecula* is more sensitive over a wide range to low frequencies than the other marsupials.

Based on the distribution of the bullate stapes among mammals, it appears that there is no obvious correlation between the possession of a bullate stapes and any particular habit or ecology. A wide size-range is represented by the marsupial species showing a bullate stapes, from the 10–17 g *Acrobates* to the much larger *Trichosurus* reaching around 4.5 kg (Nowak 1999). They include mostly arboreal species, omnivorous-herbivores and predominantly nectar-eaters (Hume 1999).

In summary, we report here the presence of a singular specialization of the stapes in three marsupial taxa. Based on the study of pouch-youngs of one of them, we observe that this feature appears relatively early in ontogeny. A bullate stapes represents either an autapomorphy of Phalangeriformes lost independently in several members of this monophylum, or characterizes several clades within this group of diprotodontian marsupials.

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Authors' addresses:

MARCELO R. SÁNCHEZ-VILLAGRA, Spezielle Zoologie, Zoologisches Institut, Universität Tübingen, Auf der Morgenstelle 28, D-72076 Tübingen, Germany

(e-mail: marcelo.sanchez@uni-tuebingen.de);

SIRPA NUMMELA, Department of Ecology and Systematics, University of Helsinki, P.O. Box 17, FIN-00014, Helsinki, Finland.

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Short Communication

Twinning in the big fruit-eating bat *Artibeus lituratus* (Chiroptera: Phyllostomidae) from eastern Paraguay

By R. D. Stevens

Department of Biological Sciences, Texas Tech University, Lubbock, Texas, USA

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Although the litter size of bats is variable and ranges from one to five (Hamilton and Stalling 1972), multiple embryos in American leaf-nosed bats are rare and have been reported for only a few species. Twinning in the Phyllostomidae was first reported for *Macrotus waterhousii* by Cockrum (1955) and then by Bradshaw (1961). Barlow and Tamsitt (1968) later reported twinning in three additional species: *Glossophaga soricina*, *Erophylla sezekorni*, and *Artibeus jamaicensis*. Herein, I report twinning in *A. lituratus*.

Artibeus lituratus is widely distributed geographically, ranging from northern Mexico to northern Argentina (Koopman 1993). This species exhibits considerable geographic variation regarding color, morphology, diet, and reproductive patterns (Baker et al. 1976, 1977, 1979). Wilson (1979), based on extensive data, suggested that reproductive patterns in this species are geographically variable, ranging from monoestry at the northern limit of its range to bimodal polyestry (Thomas 1972) and acyclic breeding (Tamsitt and Valdivieso 1963, 1965; Tamsitt 1966) in Colombia. Subsequently, Willig (1985) demonstrated that *A. lituratus* exhibits seasonal bimodal polyestry in northeastern Brazil. Sazima (1989) demonstrated that the timing of reproduction is dynamic in this species and dependent on weather patterns and primary productivity. Although patterns of reproduction are well documented, no report of twinning in this species currently exists.

Of 864 female *A. lituratus* collected and necropsied in this investigation, I encountered one gravid female containing two embryos. The female was caught on 29 December 1997 at Yaguarete Forests, located approximately 40 kilometers due east of the town of Santa Rosa de Lima in the department of San Pedro in eastern Paraguay (23° 48.50′ S, 56° 07.68′ W). The twins consisted of one male and one female. Accordingly, they were likely the result of fertilization of two separate ova. They were 11.6 mm and 11.3 mm in length, respectively. Toothwear on the mother was relatively slight and she was post lactating, suggesting that she was relatively young in age but had previously produced offspring.

Several explanations have been put forth to account for the paucity of instances of twinning in the Phyllostomidae. Barlow and Tamsitt (1968) suggested that differences in litter size between vespertilionid and phyllostomid taxa exist because these groups have evolved in or radiated from areas that differ in seasonality and the length of growing seasons. They suggest

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